

need for rest after mental and after manual work, it was said that the need was greater after the former, and that in considering the price to be paid for any manual production, it was impossible to fix the material value of mental work performed in the same time (as was taken by the manual production) in order to give an equal price as was suggested by the writer.

Miss Nesbitt's ideas were very highly appreciated, but it was thought that if we allowed the maids to leave undone those things of which they did not approve it would lead us to a serious *impasse*; rather let us educate them and draw out their taste. Perfection is equally beautiful in their work as in our own.

CRITICISM LESSON ON ORDNANCE MAPS.

By J. H. SMITH.

Objects:—

1. To teach the girls how to read an Ordnance Survey map.
2. To increase the girls' interest in maps.
3. To increase their powers of imagination.

Draw from the girls what they already know about Ordnance maps. Put the signs on the board and let them say for what each stands.

Draw from the girls the following similarities and contrasts between an ordinary and an Ordnance map:—

Similarities.

Drawn to scale. Marking of the lines of latitude and longitude. Coast line, lakes, etc., shown in the same way. Railway lines sometimes shown on ordinary maps and always on Ordnance maps; etc.

Contrasts.

More detail given in an Ordnance map. All roads, towns, villages, hamlets, etc., are marked. Mountains are shown by contour lines instead of by "shading," as on an ordinary map; etc.

Draw from the girls what they can tell about the mountains (where the rise is gradual or sudden, where the valleys and ridges lie, etc., etc., from the contour diagram on the blackboard. Explain that trigonometrical stations are heights taken by the men of the Ordnance Survey and marked by cairns, which serve as guides in measuring other levels in the district.

Ask the girls if they know a bench mark and its meaning. If not, explain that it is a broad arrow with a horizontal line at its apex, placed at least every mile, and generally oftener, to mark the level of the road above the sea at that point. Ask the girls if they have seen these marks, and where?

Draw on the board an imaginary map illustrating most of the Ordnance signs for mountains, woods, roads, churches, post-offices, etc. Let the girls read it, telling what sort of a country they would traverse if they took a walking tour from the village at A to the town B, and what would be their compass direction.

THE TEACHING OF MATHEMATICS AND ARITHMETIC.

By A. C. EDGAR.

Before discussing the methods of teaching any particular subject, we should first inquire into the reason why it needs to be taught at all. I shall therefore begin this paper by saying that mathematics and arithmetic occupy an important place in our curriculum, not only on account of their intrinsic value, but also because they should be of use to a child in helping him to form habits of attention, concentration, quickness, etc., in training him to be accurate, in developing his power of reasoning, and even in providing opportunities for strengthening his will. And for this reason it is a great mistake to try to teach mathematics when our pupils are at all tired mentally. Therefore, if they have already been working at other subjects, it would probably be well, before beginning such a lesson, to give them drill

for two minutes, or even to send them for a short race in the garden.

As my time is limited I shall not discuss the earliest arithmetic lessons, although they are the most important.

When the child has outgrown the elementary stage of his arithmetic lessons, very special care is needed to prevent his falling into careless habits, or taking a dislike to the subject. Much mental work is still most essential; questions on the multiplication tables especially should be asked if possible at every lesson. These should take the form of small problems—*e.g.*, divide three guineas equally among seven people; how many pence in 8s. 4d.? and so forth. Sometimes, for the sake of variety, the pupil might take the part of the teacher and ask questions of her; if she occasionally gives a wrong answer she will discover whether the child is quick enough to notice her mistake at once. But in whatever way we give our mental arithmetic, we must insist always upon quick and accurate work. Great attention must also be paid to all written work, and the pupils should never be allowed to put down a sum untidily.

Besides mentioning the necessity for good mental work and neat exercise-books, I shall also refer to the danger of giving too much help, and so accustoming our pupils to depend upon our aid rather than trust to their own powers. We are sometimes tempted to smooth over difficulties and to try, in fact, to prepare a "royal road" towards arithmetical attainments; but the consequence of this attempt will only be that we effectually bar the way to the child's acquiring any such knowledge at all. Thus their school work should train them to be self-reliant and persevering; if they become so in such matters as arithmetic, they will be less inclined to shirk other little duties, and while in this way their character is gradually strengthened they will discover for themselves the truth that "every effort is a victory and a joy."

This idea suggests a solution of the question of whether

underlying principles should be taught when children are learning rules. I think we should do more harm than good if we attempted any explanation to which we expected our pupils to listen without being asked to supply some definite and independent thought. Our business is simply to set their minds working on the right lines, and not to hinder their efforts by giving an unnecessarily wordy lesson. I heard lately of a small boy who in the middle of an arithmetic lesson said to his governess, "I shall think in a minute; I can find it out if you'll stop talking." Such a remark warns us to make our explanations very short and simple, and to give children plenty of time to reason out the question in their own mind.

In teaching mathematics we should have frequent recourse to problems. I think that most, if not all, new rules, both in arithmetic and algebra, might be introduced by some simple problem that will show the children the practical application of what they are learning. Problems are also useful in relieving the monotony of more mechanical work; therefore, instead of first doing an exercise containing long sums only, and then working through another filled with problems which exemplify the same rule, it would be better to take the two together and let the problems alternate with the ordinary sums. Problems, of course, occur often in practical geometry, but these are of a somewhat different nature, and should be employed for two purposes peculiar to themselves: (1) to accustom children to draw diagrams to scale neatly and accurately, (2) to prove how closely connected geometry is with arithmetic.

We should indeed take every opportunity in the course of our work to point out that arithmetic, algebra and geometry are merely branches of one and the same subject—mathematics; and therefore what is learned in one of these lessons will often throw light upon a rule used in another. For example, the rules for finding the square and cube roots of large numbers, which to many people appear complicated

and difficult to remember, will no longer be stumbling-blocks to a child who, having learned that $(a+b)^2 = a^2 + 2ab + b^2$, and that $(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$, has discovered how the above-mentioned rules are based upon these formulæ.

As mathematics is an exact science, we must never bewilder our pupils by hurrying them on into new difficulties before they have thoroughly mastered what they have already been taught; neither may we allow them to get into the way of saying that they *think* they have understood a lesson—such a remark only reveals the fact that, having no clear idea about the matter, they are content to remain unenlightened. And, again, we must beware of their acquiring the habit of accepting what we say because we say it, instead of reasoning out the question for themselves. At this rate their progress may be very slow, but it will be sure, and they will have the satisfaction of feeling that they really understand all that they are learning. In teaching Euclid, for instance, when we go over a proposition for the first time we should give as little help as possible, trying rather to make the children discover the correct proof for themselves. Then in the next lesson they should write it all out neatly, taking care to draw the figure accurately; finally, before learning another proposition, they should do some exercises on the previous one. Thus they will not only understand what they have been taught, but will be able also to apply it in proving other geometrical truths. All this takes time, but it will be time well spent.

In concluding, I should like to quote the words of a modern author. "Pure mathematics," he says, "are divine, eternal in the heavens, not in time or in space, but one and the same alike in God and man. So," he continues, "are applied mathematics." Let us never forget this high conception of what we are engaged in teaching, and though we may only dimly recognise the majesty of these perfect truths which have been "before all worlds," yet in our teaching we may impart the seeds of what will grow to be

a real love of mathematics, and the children whose entrance into these realms we guided may in after life progress far, hailing each advance with wonder, reverence, and delight.

TEACHING OF MATHEMATICS AND ARITHMETIC.

After Miss Edgar's paper showing the close relationship of the three branches of mathematics, Miss Stevens gave us some valuable hints on the subject. In the course of her address she said:—

Elementary mathematics are certainly most important. It is in the very beginnings that one has to be careful, for it is then that the child's mathematical tendencies are encouraged or their interests repressed, and we must walk warily lest we cut the child off from a wonderful world, a kingdom which, though different, may give as much delight and as much sense of completeness as either music or art may do. Mathematics is a wonderful subject, and not one to be slurred over; sometimes those who are busy with mental work find "figuring" their greatest recreation.

In studying mathematics it is absolutely essential to give one's whole attention to the subject, for the whole lesson; in fact, the foundation of all mathematics is concentrated thought. The lesson may be short, in some cases must be short, for the attention must never be allowed to wander. The whole time must be devoted to the mathematical problem when once the process of its solution has begun.

If we teach arithmetic only for the actual use we can make of the sums later, our arithmetic books would be very thin; but the subject is splendid as a discipline; it is so strong and vigorous, and for the opportunity it gives of overcoming difficulties. But it can be dull, and if the attention of the teacher wanders it is not surprising that we do not get great results from our pupils. Geometry especially is difficult to teach at the beginning. Straight lines seem less tangible

than figures; but we must not be discouraged, but think of the end in view.

When in difficulties follow Bompas Smith. As regards Sonnenschein and Nesbit, we must leave out a great part—the cubes and staves, etc., and many exercises which are too difficult. Don't let children write at first; they want concentration, and it is quite enough for them to work in their heads, and writing is a difficulty. If they do write down the sums, let the words be left out, and such terms as "multiplicand" and "subtrahend," etc., are unnecessary at this stage.

Do not give rules; let the children find them out for themselves through numerous examples.

During the discussion it was suggested that in mental arithmetic children should sometimes take the place of their teachers for variety. This, however, is to be deprecated in the case of very young children, as they resent being tricked, and they believe their teachers are always right.

"Suggestions in Arithmetic," by Macdougall, was recommended as useful for backward children.

MRS. CURWEN'S METHOD.

By H. E. WILK.

Many people are inclined to think all music methods are fads. The girl who was taught in the "ordinary way" generally manages to play well if she is musical, and I am not sure myself that the sorrow over early lessons is as great as is sometimes described. But even the girl who plays well has generally an extraordinarily untrained ear, and cannot transpose, nor has she any smattering of harmony or musical form, and more often than not, she cannot read. Evidently something was lacking in her training.

But unfortunately so many modern methods are indeed "fads." They aim at easiness, pleasantness, play and work combined, and unconscious learning. The result is,

a child with no power of attention or concentration. That all learning should have a disciplinary effect upon the brain is so often overlooked in the present-day desire to make everything easy and pleasant.

Now, what should be our object in teaching a child music? Does he learn because everyone else does? Or do we expect him to display genius? No. A child should learn in order to become a musician—that is, in order to be able to appreciate music intelligently, and to be able to play, however little, well and musically. Then, if this wide aim is to be ours, we cannot teach our small pupil simply to play little pieces, with various finger exercises and scales, as steps to larger pieces. Every side of his musical perception must be trained. He must, by finger, wrist, and arm exercises, learn perfect control of his muscles; his sense of rhythm and tune must be educated; he must learn that simultaneous control of eye and hand which will enable him to read at sight; and lastly, why some sounds make music and others do not. That is, his muscles, eyes, ears, and brain must each receive attention, and no one at the expense of any other.

Having decided what to teach, it remains to discuss how we are to teach it. Well, there are certain educational rules which we all learnt when up here in Ambleside. They hold good always. Some are:—

- (1) Teach the thing itself before the symbol.
- (2) Present one fact at a time.
- (3) Take the easy before the difficult.
- (4) Aim at perfection always.
- (5) Let each lesson grow out of the last.
- (6) Never tell the pupil anything he can find out for himself.

If we remember all this—our aim in teaching music and the principles to which we will hold in teaching it, we shall be doing right. More than that, we shall really be using Mrs. Curwen's method.

You who teach Child Pianist will know what emphasis she places on presenting the "Concrete before the Abstract." There is a pitfall for the unwary in that expression. Do not think that the concrete, coming first, means that the teacher must always appeal to eye and touch, as, for instance, by giving models of notes to the child. That is not education. The better the teacher, the less she depends on special apparatus. Anything to hand will serve to illustrate her meaning. And so Mrs. Curwen means that we should present to our pupil, first of all the thing itself, and then the symbol. That is, first the sounds and then the pictures of them. Every new step must proceed on those lines.

Then, although in one sense, music being a many-sided study, there will be a multitude of things to be learned by the pupil; yet each thing is first to be mastered separately. There is a reading exercise for time only, and another for pitch, with a third combining the two, and so on. We all know how difficult it is to do equally well two things at the same time.

Again, Mrs. Curwen upholds that the easy should be taught first. Children should learn that which it is possible for them to play absolutely correctly. Nothing less than perfection may be their aim. More than that, a careful teacher will manage that mistakes are avoided, even in reading a new piece. She will let the child study the music first with eye and brain.

And, finally, by connecting each lesson with the last, the pupil will be able to meet his succeeding difficulties with assurance and ease; for, by the help of what he has already learnt he can generally, with a leading question or two, go the step further by himself. Knowledge gained that way is not easily lost. I can well remember a small pupil's delight at finding out each succeeding scale for herself. She was only ten, but I have known girls twice that age who have even learnt rhymes in order to remember their scales, and are then still uncertain!

I hope I have shown sufficiently clearly the educational advantages of Mrs. Curwen's method. In practice it has been found to work well. The small pupil I have referred to is now at school, and her master considers her musical teaching to have been quite exceptionally good. But we have all, probably, come across people who have definite objections to the Child Pianist. For instance, they declare there is not time in a short lesson to a pupil of, say 8, to get in finger exercises, sight-reading, time dictation, and ear-training in pitch, as well as the little piece or duet learnt. But there is the time if the teacher thoroughly well prepares the lesson beforehand, and if she is very careful not to talk overmuch, nor even to allow her pupil to talk too long. Also she must be very methodical, and divide up the time carefully, not giving over many minutes to any one thing at the expense of the next. Much time can be saved by learning part of the ear-training to the singing lesson. Tonic Sol-fa, of course, will be used. May I say that it is unfortunate so many teachers use the sol-fa notation only. If they would make their pupils really "hear with their eyes," they should frequently, and from the very beginning, encourage singing from the staff-lines, in various keys, always using Sol-fa names.

Another objection I have come across is that there is too much talking in a Child Pianist lesson, and not enough music. The answer is obvious. The teacher is at fault—not the method. But it is an easy mistake to make, though very bad for any child, however interested and keen he may be. There seems so much to be explained; but we all remember the child who could "understand better, mummie, if you didn't explain quite so much."

Then, again, many people object to "taa." The rest of the method is quite sensible, they say, but "taa"! What nonsense. These people generally know nothing about the method at all except this weird use of "taa." They think that is the whole method. But it is really admirable, for it

simplifies time to such a degree that a child once started, can gradually find out even the most complicated tune for himself. And this, not as a game, but by the help of the piano, his own brain, and leading questions on the part of the teacher. I have been asked when should taa-ing be given up. I think it should always remain in the background, ready to help in cases of difficulty; but I would like to warn against its use aloud while the child is playing any tune. In the exercises for *time* only, yes; but in other exercises, no. If used, the child listens only to his own voice, and that bores him and stunts his musical sense.

One more objection I have met. The child does not visibly, or rather, audibly, make rapid progress. This is quite true, and it is really one of the merits of the Method. "Festina lente." I think we all feel a little suspicious of very quick results from anything. The foundations in music must be well and carefully laid. If you mean to train all the musical capabilities of your pupil, you cannot expect such rapid progress as if you leave three-quarters of them untouched. But the advance made will be symmetrical and real. When the audible results come, they will be really musical results.

Miss Loveday gave a most interesting talk on Miss Seppings' music method, illustrating her subject with the bricks used in the method.

DISCUSSION.

Several points were raised in the discussion which followed these papers. Some thought that the principles underlying Miss Seppings' method could well be carried out without the use of such extensive apparatus. Those who had taught music according to her method bore testimony to the fact that it certainly gave their pupils great power in transposing, because they had been accustomed to think of intervals in relation to the key-note rather than to decipher each particular note.

Miss Parish had heard from Miss Seppings that unmusical people could teach music if they followed her method, whereas Mrs. Curwen asserts that no unmusical person can possibly teach another. There was a distinct feeling that we ought to remain loyal to the Child Pianist method of teaching, because it demands no apparatus other than the piano, a pencil and paper; but at the same time we were reminded that Miss Seppings' method was new to us, and ought not on that account to be looked upon with unfavourable prejudice.

Miss Loveday advised those who followed this method of teaching to join the Children's Music Club, which entitles members to a criticism from Miss Seppings, and advice respecting the pupil's work.

Miss Seppings has offered to take House of Education students through a course of instruction on specially reduced terms, which may be had on application.

SUGGESTIONS ON THE CURE OF CONTRADICTORINESS.

BY ELEANOR M. E. WILKINSON.

The following are not offered as a comprehensive review of the causes and cure of contradictoriness, but as suggestions which, it is hoped, may prove helpful by provoking discussion on the subject, whereby one often gains far more help than by the actual written paper.

In order to find a cure for contradictoriness we must first ascertain what are the causes that lead to this undesirable mental and moral attitude—for it is, perhaps, rather as an "attitude" than as a quality that we can best describe it and look for its cure. A child who is contradictory is generally so from one of the following causes:—

- (a) Self-assertiveness—shown in defiance of authority.
- (b) Intellectual strength—manifesting itself in the love of argument.
- (c) Peevishness—due to ill-health.
- (d) "Cussedness."

Let us first consider self-assertiveness as a cause. Everyone has, at some time or another, come across a child who, when told to do a certain thing, becomes defiant and, if possible, goes in a diametrically opposite direction to that indicated. Now while this may conceivably be due to a want of tact in the way the order is given, it is far more often caused by the wish of the child to show that he has a "will" to assert—in other words, that he is a personality to be dealt with. Of course, ignorance of the real meaning of authority, and of the necessity of obedience to law as a rule of life, is at the root of this difficulty, and the cure must differ according to the age of the child. With a very young child, who cannot yet understand the ethical point of view, the great aim should be to cultivate the habit of instant obedience; with an older child the *nature* of authority should be taught, and the nobleness of obedience to law as a life-directing force. In this connection the stories of ancient Greece and Rome should be of great help, for they have an undying attraction for the young, and inculcate, together with their inspiring patriotism, self-restraint and obedience to law. For older children, I know of nothing written finer than Mazzini's essay on "Liberty" in "The Duties of Man," as showing the true nature of authority.

(b) The second cause of contradictoriness, viz., intellectual strength, generally manifests itself in a love of what I once heard graphically described as "argufying." The child has no real intention of *not* carrying out the wishes or commands of an elder, but he finds it rather interesting to discuss the question from his point of view. Now this may seem harmless enough; but it may become both tiresome and annoying to the people with whom he has to live, and must be accordingly discouraged. In this case it might be well to insist on the thing being done *first*, and then talk about it afterwards; but since it is clearly a case of misdirected intellectual energy, might it not be better to cure the evil by offering a legitimate field for the exercise

of his reasoning powers, such as a debating society, or experimenting in some natural science like botany, geology, or natural history, all of which are full of problems and require the exercise of the reasoning powers to the fullest extent?

(c) There is yet another cause of contradictoriness which is generally to be traced to ill-health, viz., peevishness, when anything that is suggested to amuse or distract the child seems only to have the effect of increasing its contradictoriness. This can only be dealt with from one point of view—remove the causes of ill-health, and the peevishness will vanish with them. It may be a case for consulting the doctor, or merely a question of common-sense and practical hygiene, such as more fresh air, more exercise, less work, or more suitable food. In any case, the fault is not here in the child itself—or, rather, the cure is not under its own control, and it must not be treated as if it were.

(d) We often hear the expression applied to grown-ups as well as children, "Oh, he (or she) did it out of pure 'cussedness'!" Now I confess this is quite beyond me to define, and therefore to suggest a cure. One knows it when one meets it, and I suppose it is more nearly allied to obstinacy than any other quality. But why do we do things out of "cussedness"? I cannot imagine. In the light of reason and common sense it has no place, and were we always governed by "sweet reasonableness" I suppose we should never be guilty of so acting. Yet one meets it again and again, and perhaps more in boys among children and in women than in men. It is something so intangible when one tries to define it, and seems to depend more upon a state of feeling than anything else, and therefore I think it is connected with the "personal equation." We may perhaps prevent "cussedness" to some extent by tactful dealing with others, but for ourselves and our children the only suggestion that I can make is that we should cultivate "sweet reasonableness" both in ourselves and them.